HPT Data

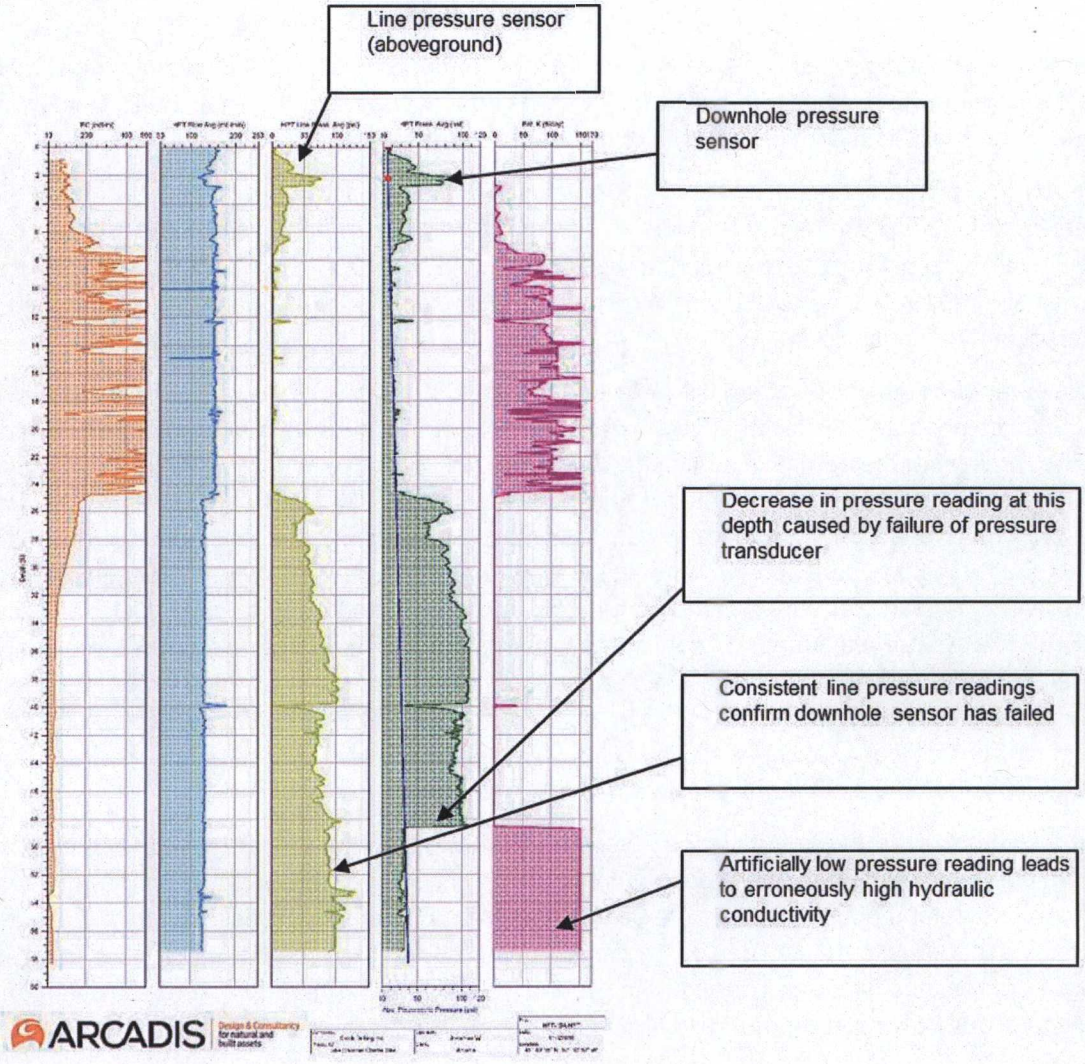
The shallowest native geologic unit at the Site is a low-permeability silty clay located immediately beneath the anthropogenic fill deposits. The silty clay unit was encountered at every soil boring location and extends to the maximum depth of all soil borings completed.

Previously, Paul Lake of the IEPA inquired about specific portions of the hydraulic profiling tool (HPT) logs presented in the Tech Memo (Arcadis 2017), specifically regarding the silty clay unit. Mr. Lake interpreted several of the logs (including those for HPT-01, HPT-10, and HPT-10A) to suggest the presence of a relatively permeable zone atop the silty clay layer that serves as a regional barrier to vertical groundwater migration.

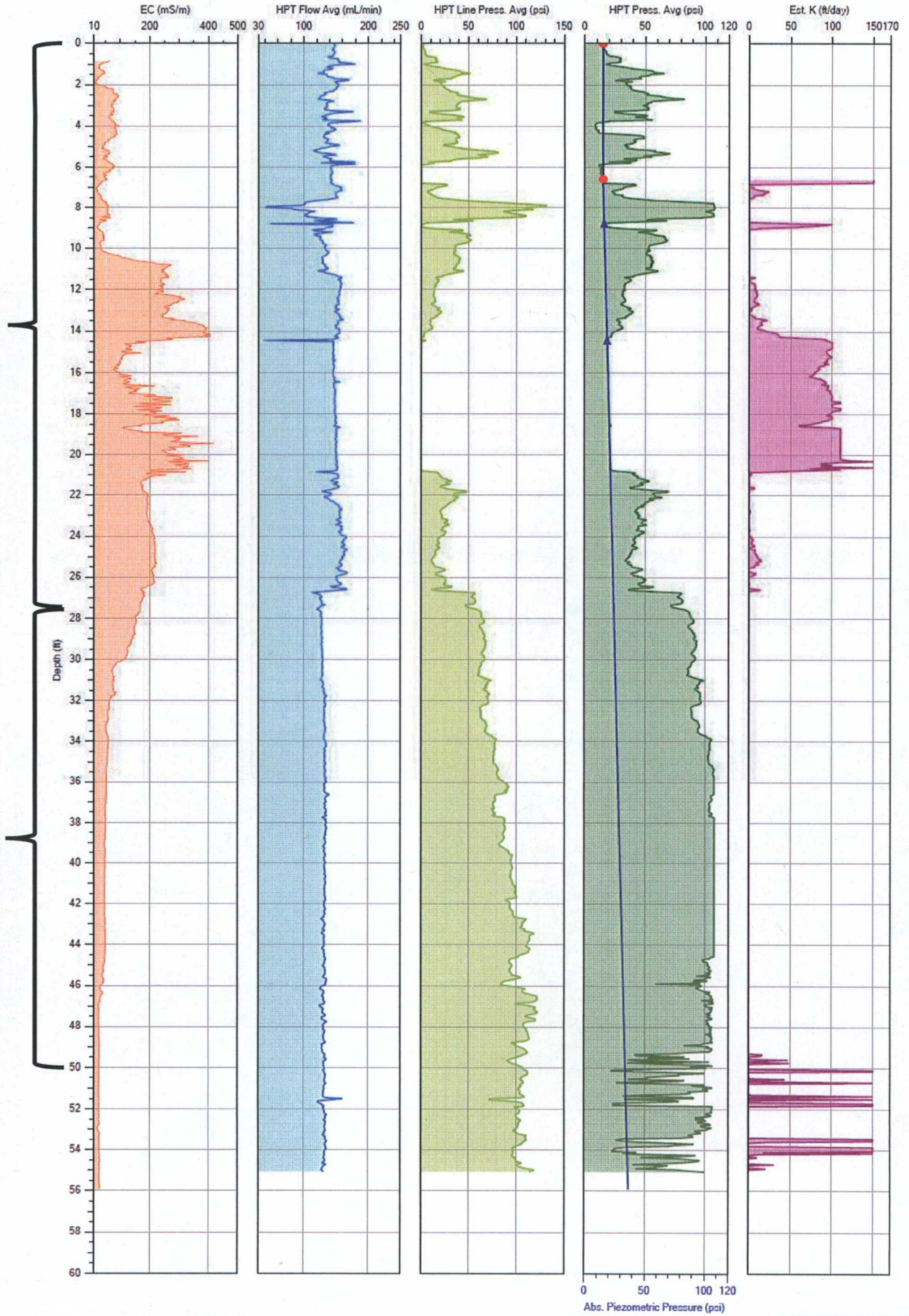
The appearance of a higher-permeability unit in these logs is an artifact of a pressure sensor failure within the HPT equipment, and review of all the sensor data presented in the logs indicates that a permeable unit is not present at the depths in question. When HPT-01, HPT-10, and HPT-10A were completed in 2015, the Arcadis geologist noted that drilling conditions at these locations were more difficult than elsewhere on the Site, leading to greater wear on equipment. In particular, at location HPT-10, the drilling crew noted that the pressure sensor within the drilling tooling failed at a depth of approximately 48 to 49 feet below ground surface (bgs) and required replacement after the boring was complete. A second boring, HPT-10A, was attempted at an adjacent location to obtain more representative pressure data, but a similar sensor failure occurred. The pressure sensor failure resulted in a higher reported estimate of relative hydraulic conductivity on the HPT log, as shown below. The geologist determined that a unit with a higher silt content was present at these locations and depths, which was causing transducer failure and, thus, HPT logs that were not representative of the true geological conditions.

The attribution of this issue to the pressure sensor failure was confirmed through review of the "line pressure" sensor output on the HPT equipment to the downhole pressure reading on the HPT tooling. The line pressure and downhole pressure sensors both track hydrostatic pressure within the water injection line that runs to the downhole injection port and provide similar relative pressure readings when both sensors are functioning normally. In the case of HPT-01, HPT-10, and HPT-10A, a divergence in the two sensors' output is noted at depth, corresponding to failure of the downhole sensor.

HPT Log


Line pressure sensor (aboveground)
Downhole pressure sensor
Decrease in pressure reading at this depth caused by failure of pressure transducer
Consistent line pressure readings confirm downhole sensor has failed
Artificially low pressure reading leads to erroneously high hydraulic conductivity
ARCADIS
Design & Consultancy for natural and built assets

SB-HPT-01



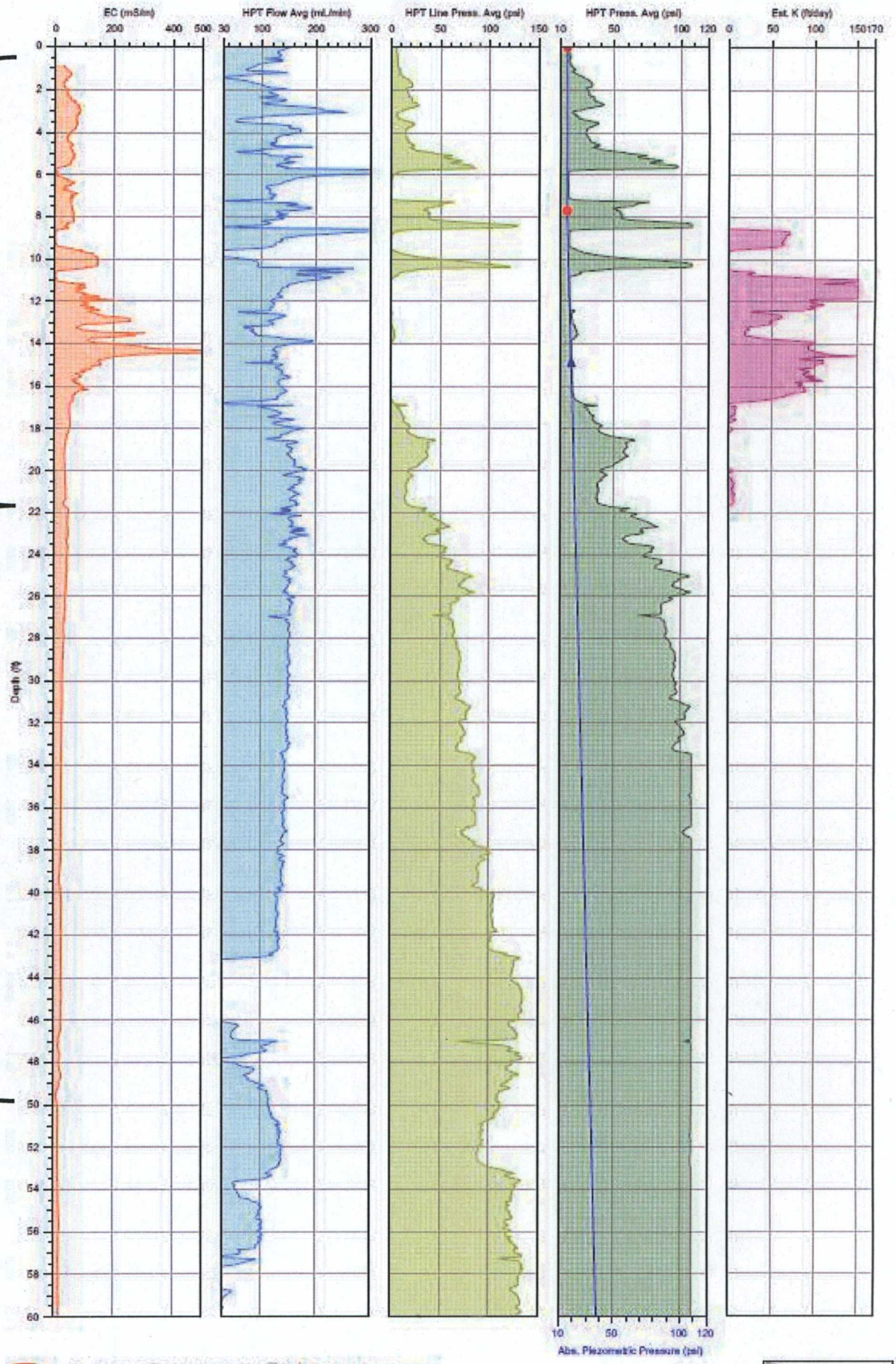
Fill Material – Gravel, silt, and sand. Mixed municipal and Industrial Waste

Gray high plasticity clay and silt

ARCADIS Design & Consultancy for natural and built assets

Company: Stock Drilling Inc.	Operator: Jonathan W.	File: HPT-01.HPT
Project ID: Lake Calumet Cluster Site	Client: Arcadis	Date: 10/30/2015
		Location: 41° 40' 45" N, 87° 34' 6" W

SB-HPT-05



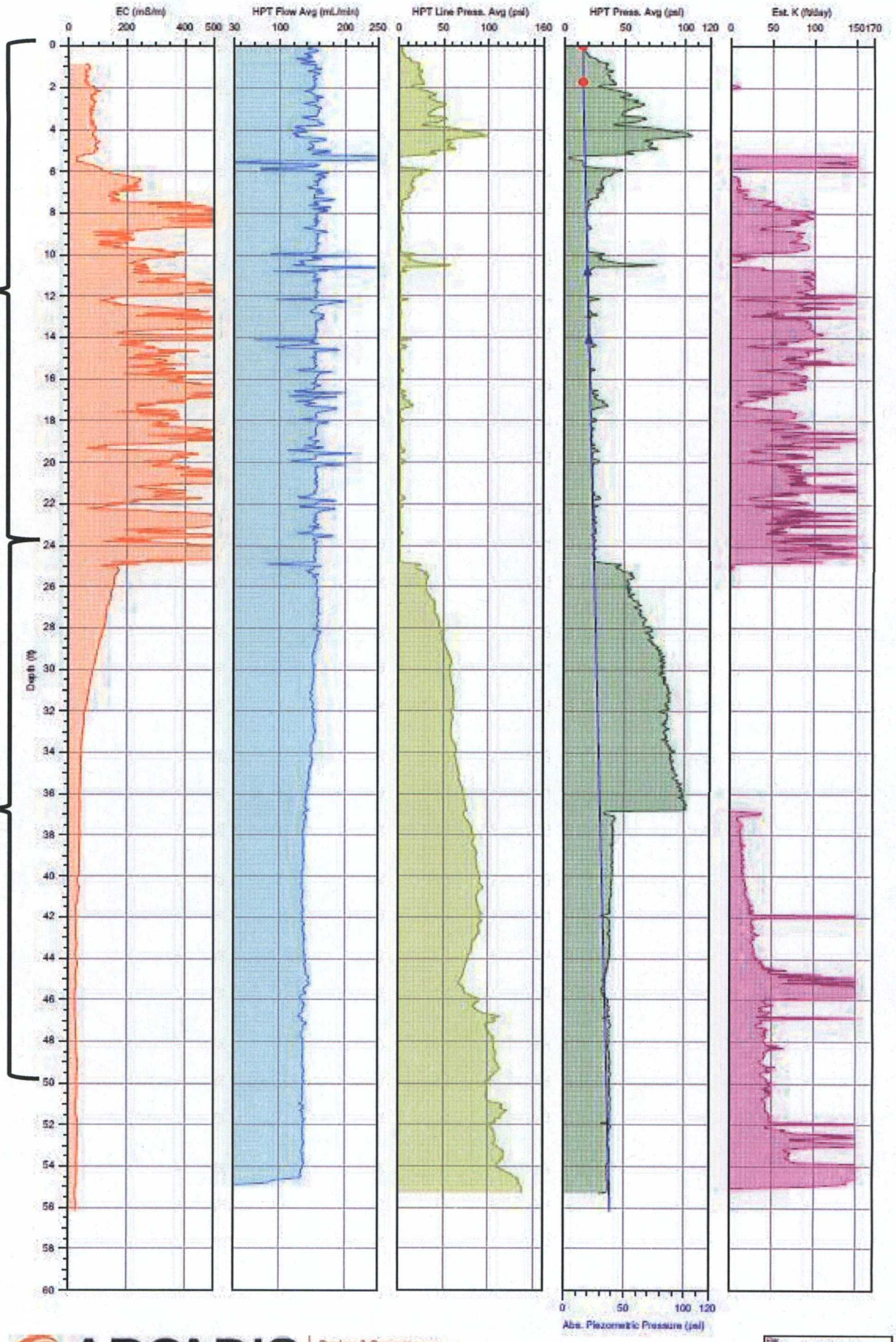
Fill Material – Gravel, silt, and sand. Mixed municipal and Industrial Waste

Gray high plasticity clay and silt

ARCADIS Design & Consultancy for natural and built assets

Company: Stock Drilling Inc.	Operator: Jonathan W.	File: HPT-05.HPT	
Project ID: Lake Calumet Cluster Site	Client: Arcadis	Date: 10/26/2015	
		Location: 41° 40' 43" N, 87° 33' 52" W	

SB-HPT-10



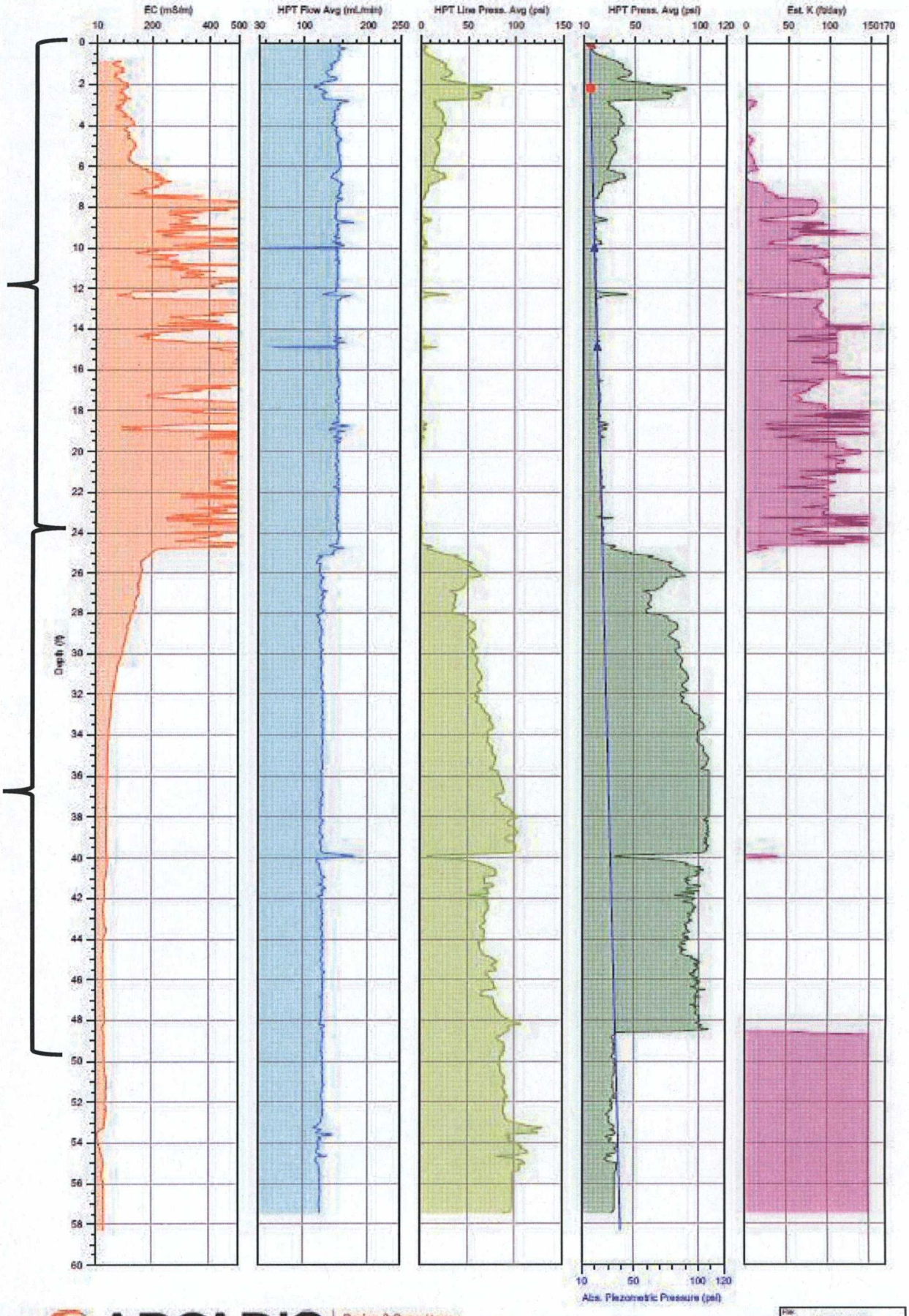
Fill Material – Gravel, silt, and sand. Mixed municipal and Industrial Waste

Gray high plasticity clay and silt

ARCADIS Design & Consultancy for natural and built assets

Company: Stock Drilling Inc.	Operator: Jonathan W.	File: HPT-10.HPT
Project ID: Lake Calumet Cluster Site	Client: Arcadis	Date: 10/27/2015
		Location: 41° 40' 35" N, 87° 33' 52" W

SB-HPT-10A



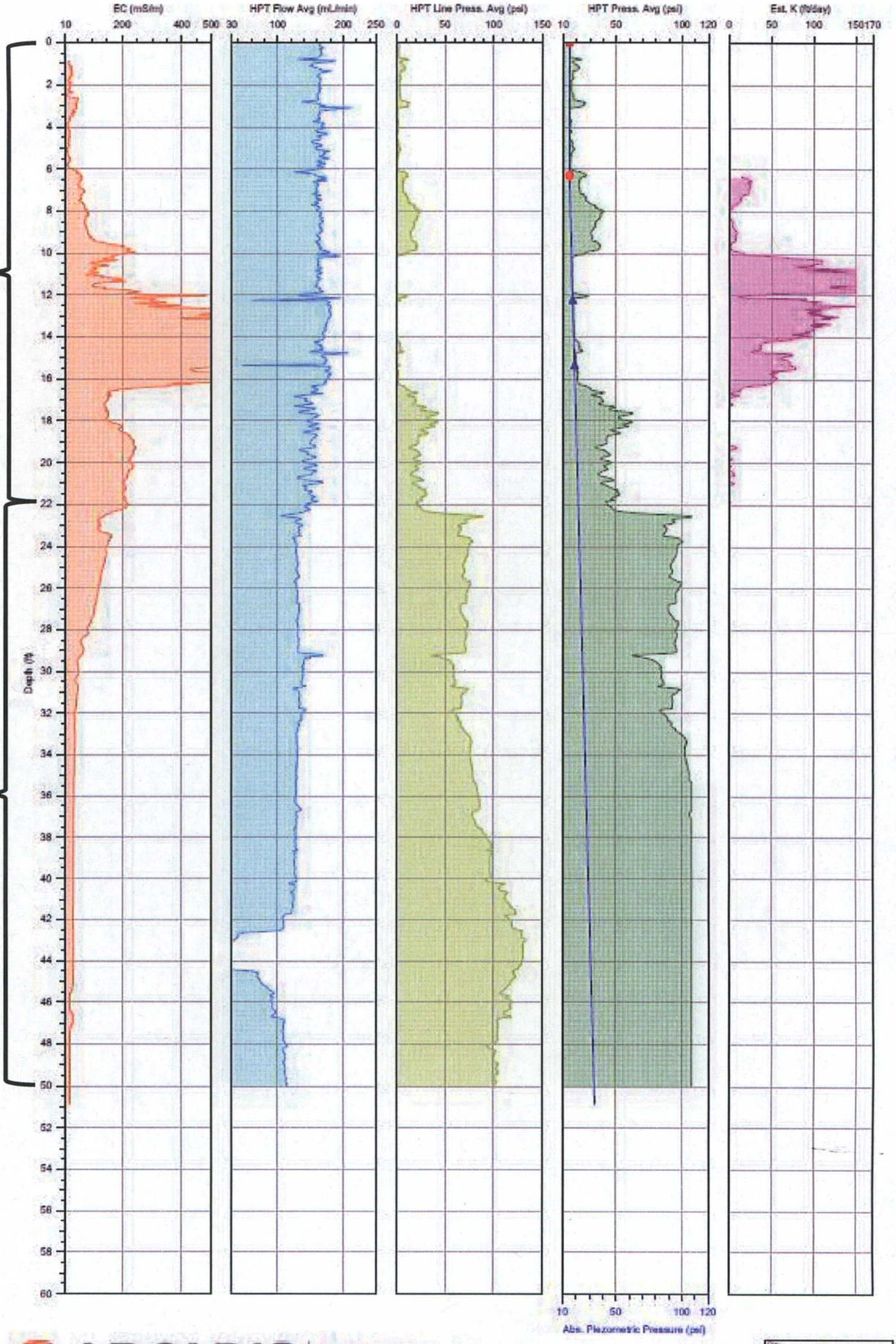
Fill Material – Gravel, silt, and sand. Mixed municipal and Industrial Waste

Gray high plasticity clay and silt

ARCADIS Design & Consultancy for natural and built assets

Company: Stock Drilling Inc.	Operator: Jonathan W.	File: HPT-10A.HPT
Project ID: Lake Calumet Cluster Site	Client: Arcadis	Date: 11/3/2015
		Location: 41° 40' 28" N, 87° 33' 52" W

SB-HPT-14



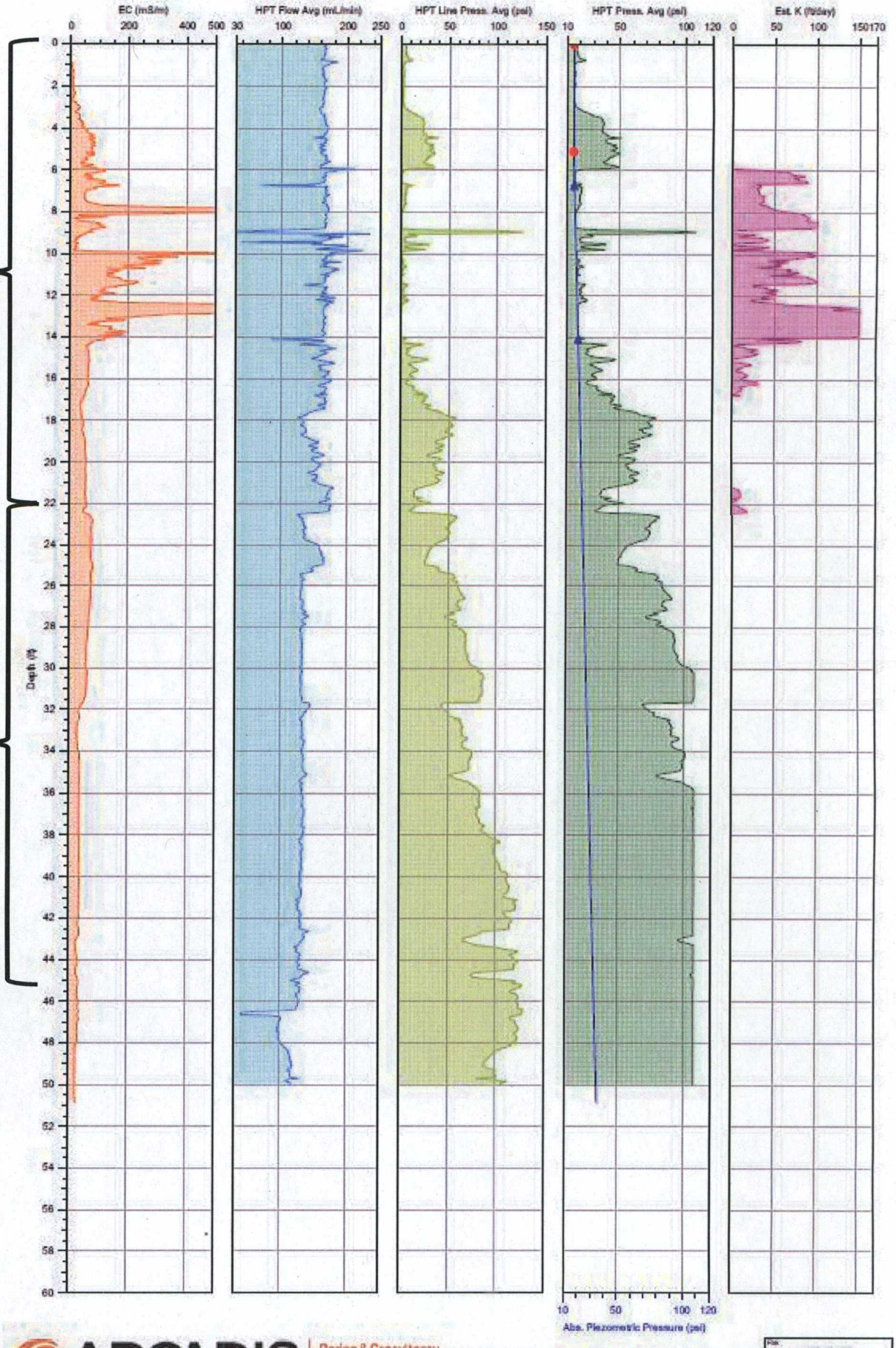
Fill Material – Gravel, silt, and sand. Mixed municipal and Industrial Waste

Gray high plasticity clay and silt

ARCADIS Design & Consultancy for natural and built assets

Company: Dbick Drilling Inc.	Operator: Jonathan W.	File: HPT-14.HPT
Project ID: Lake Calumet Cluster Site	Client: Arcadis	Date: 10/28/2015
		Location: 41° 40' 26" N, 87° 33' 53" W

SB-HPT-17



Fill Material – Gravel, silt, and sand. Mixed municipal and Industrial Waste

Gray high plasticity clay and silt

ARCADIS Design & Consultancy for natural and built assets

Company: Stock Drilling Inc.	Operator: Jonathan W.	File: HPT-17.HPT
Project ID: Lake Calumet Cluster Site	Client: Arcadis	Date: 10/29/2015
		Location: 41° 40' 26" N, 87° 34' 1" W

Kolak, Shari

From: Leo Brausch <Lbrausch@brauschenv.com>
Sent: Monday, July 8, 2019 3:21 PM
To: Kolak, Shari
Cc: 'Kratzmeyer, Jack'; Gates, Ellyn; Pennington, Andy; Darby, Thomas; Susan Franzetti
Subject: LCCS Reference Materials
Attachments: Pre-Meeting Submittal 1. Soil Boring Logs Used in Cross Section.pdf; Pre-Meeting Submittal 4. HPT with Summary of Lithology.pdf

Shari,

The two attached files provide information requested in your 6/17/19 email regarding the evaluation of the clay confining unit at LCCS. The first provides the logs of soil borings that were used to construct cross-sections (Comment 1). The second provides lithological information on the HPT logs (Comment 4). We plan on discussing this information as well as the other issues you raised during of July 10, 2019 meeting. In the meantime, if you have questions or concerns, please do not hesitate to contact me. Thanks.

Leo M. Brausch
Office: (704) 246-7266
Cell: (412) 720-8549
Fax: (980) 339-3017